

MEMS DUAL DRIVE STRUCTURE

ABSTRACT OF THE INVENTION

A MEMS scanning device includes more than one type of actuation. In one approach capacitive and magnetic drives combine to move a portion of the device along a common path. In one such structure, the capacitive drive comes from interleaved combs. In another approach, a comb drive combines with a pair of planar electrodes to produce rotation of a central body relative to a substrate. In an optical scanning application, the central body is a mirror. In a biaxial structure, a gimbal ring carries the central body. The gimbal ring may be driven by more than one type of actuation to produce motion about an axis orthogonal to that of the central body. In another aspect, a MEMS scanning device is constructed with a reduced footprint.